REMARKS/ARGUMENTS

The Examiner rejects claims 1-2, 5, 9-10, 11, 13-14, 17, 21-24, 27, 30, and 34-37 under 35 U.S.C.§102(b) as being anticipated by Thierman (U.S. Patent No. 5,303,024) and claims 3-4, 6-8, 12, 15-16, 18-20, 25-26, 28-29, 31-33, and 38-42 under 35 U.S.C.§103(a) as being unpatentable over Thierman (U.S. Patent No. 5,303,024).

Applicant respectfully traverses the Examiner's rejections. Thierman neither teaches nor suggests at least the following italicized features of the independent claims:

1. A method for transmitting optical signals through free space, comprising:
providing a transmit aperture; and emitting a broad, divergent beam *comprising a plurality of optical wavelengths, each optical wavelength comprising a modulated communication,* wherein the beam has a diameter at the transmit aperture that is less than an inner scale near the transmit aperture.

11. An optical transmission apparatus, comprising:
a radiation source for emitting a beam of radiation through free space, the beam *comprising a plurality of optical wavelengths, each optical wavelength corresponding to a different communication channel*;
a modulator in communication with the radiation source for modulating the beam with information;
a transmit aperture, wherein the transmit aperture has a size sufficient to output a maximum beam diameter that is less than an inner scale of an air current at or near the transmit aperture.

23. An optical transmission apparatus, comprising:
a radiation source;
a modulator in communication with the radiation source for modulating a beam output by the radiation source with information, the beam *comprising a plurality of optical wavelengths, each optical wavelength corresponding to a different communication channel*;
a transmit aperture, wherein the transmit aperture causes the beam to be divergent.

36. A method for designing an optical transmitter, comprising:
determining an inner scale at a proposed location for a transmit aperture; and selecting a transmit aperture size sufficient to output a maximum beam diameter that is less than the inner scale, wherein said beam *comprises a plurality of optical wavelengths, each optical wavelength corresponding to a different communication channel.*

In one embodiment, the present invention is directed to providing a communication system between a transmit aperture and receiver using a beam of multiple wavelengths of radiation to carry multiple communication channels.

The diameter of the beam of radiation carrying the information is desired to be less than the inner scale near the transmit aperture or receiver. Using a (preferably collimated) beam with this property can substantially minimize power fades from atmospheric turbulence and therefore the occurrence of burst errors. The atmosphere around transmitters and receivers tend to have higher turbulent forces that can interfere with communication signals due to the heating of nearby structures or other sources of increased turbulence. By using a beam with these defined properties the user is able to minimize the negative effects of turbulent interference. The beam of radiation carries in it information that is being sent using a plurality of channels, each of which has a unique wavelength λ. These unique wavelengths of each channel of information provide a more efficient communication system that can transmit multiple channels of information simultaneously, especially at great distances.

Thierman

Thierman, the sole reference, is directed to a scintillometer for the measurement of the structure function constant and the inner scale of atmospheric refractive index fluctuations. The apparatus transmits a single source of radiation, which is then passed through a birefringent material. After this step, there exists two virtual sources of orthogonally polarized radiation traveling the same path. The unique polarization of the virtual sources is used to separate the beams at the receiver where the intensity of each beam of radiation is measured and used to determine the inner scale of the atmosphere between the transmit aperture and the receiver.

Principles of the scintillometer depend on the two virtual sources not having different wave properties. Using sources of differing wavelengths would introduce further complications to the scintillometer design and is therefore *not desired* for the application of measuring the inner scale of the atmosphere between the transmitter and receiver. It should also be noted that the radiation does *not carry in it communication information*, let alone communication information

on differing wavelength channels. Rather, the receiver determines the inner scale by measuring the intensity of the two virtual sources after they have passed through the.

Accordingly, the pending claims are allowable.

The dependent claims provide further reasons for allowance.

For example, dependent claims 9-10, 21-22, and 34-35 define a receiver apparatus or method that enables the user to receive and focus a plurality of optical wavelengths at a corresponding plurality of spatially discrete locations. More specifically, claims 10, 22, and 35 include a receiver with at least a first immersion lens able to focus first radiation of a first wavelength to form a further first radiation, where the further focused first radiation is received by a first optical detector.

Dependent claims 4, 8, 16, 29, 33, and 42 identify a receiver configuration that defines, in radians, how much of the transmitted beam is subtended by the receiver.

Dependent claims 3, 15, 26, 28, and 38 specify an angle of divergence for the beam, specifically a beam of multiple optical wavelengths for use in a communication system through turbulent air.

Applicants have added new claims 43-49. The dependent claims define an apparatus or method for laser communications at long distances, which provide further reasons for allowance. Thierman teaches a system where the distance between the transmitter and detector must be on the order of 100m away from each other. Applicants have disclosed a system which can be used in satellite communications or other long distance communication applications at distances of at least 1km.

Based upon the foregoing, Applicants believe that all pending claims are in condition for allowance and such disposition is respectfully requested. In the event that a telephone conversation would further prosecution and/or expedite allowance, the Examiner is invited to contact the undersigned.

Respectfully submitted,

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Date: 3-28-05